BIOLOGY 200 - INTRODUCTION TO MICROBIOLOGY

Department of Biomedical Sciences
Division of Science and Technology
Lecture – 3.0 credit hours
Laboratory is separate – 1.0 credit hour (see page 3)

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THE COURSE. Introduction to Microbiology provides adequate preparation for studies of advanced courses in Microbiology, Food Science, Food Microbiology and Biochemistry. The course explores fundamental elements of Microbiology to help students understand both how the body works through the immune system to prevent infections caused by pathogens including bacteria, viruses, fungi and parasites.

PREREQUISITES: An ACT score of 14 or better, General Biology (104) and General Chemistry (100) are required. Anatomy and Physiology (100) are strongly recommended but not required. The course covers several modules which when completed, gives the student a basic understanding of the interaction between microbes and their hosts.

TEXTBOOKS: Microbiology – 'A Human Perspective' - Fifth Edition by Eugene W. Nester, Denise G. Anderson, C. Evans Roberts, Jr and Martha T. Nester.

GOALS:

1. To explore, identify and characterize the major groups of bacteria, viruses, fungi and how these agents interact with their host organisms.

2. To explore the structures, properties and functions of macromolecules (Nucleic acids, Carbohydrates, Fat/oils, Proteins) found in prokaryotic and eukaryotic cells and how these macromolecules are metabolized in living systems.

3. To explore diseases caused by bacteria, viruses, fungi and parasites and how these diseases can be controlled or prevented using prophylactic agents.

4. To explore the science of biotechnology for the treatment and prevention of chronic diseases and the promotion of good health.

OBJECTIVES:

1. To attend 100% competency rate by all students in identifying the major groups and shapes of bacteria, viruses and fungi after completion of the course.

2. To achieve a proficiency rate of 70% or higher by all students in media preparation, isolation and aseptic propagation of aerobic and anaerobic bacteria as well as eukaryotic cell lines after completion of the course.

3. To achieve a proficiency rate of 70% or higher by all students in carrying out the Gram Stain procedure for the identification of Gram Negative and Gram Positive bacteria after completion of the course.

4. To achieve a proficiency rate of 70% or higher by all students in understanding and demonstrating the metabolic basis of the functions of the major nutrients in the body by all students by the end of the semester using selective modules.

5. To achieve a proficiency rate of 70% or higher by all students in identifying selective diseases and the symptoms associated with these diseases and how these diseases might be controlled/prevented.

COURSE CONTENTS: LECTURES, SCHEDULES:

Lecture Outline:

Lecture 1.

Humans and the microbial world
The molecules of life
Microscopy and cell structure
Examination 1.

Lecture 2.

Dynamics of prokaryotic growth
Control of microbial growth
Metabolism: Fueling cell growth
Examination 2.

Lecture 3.

The blue print of life, from DNA to protein
Bacterial genetics
Biotechnology and Recombinant DNA

Lecture 4.

Identification and classification of prokaryotes
Diversity of prokaryotic orgasm
The Eukaryotic members of the microbial world
Examination 3.

Lecture 5.

Viruses of bacteria
Viruses, Prions, and Viroids: Infectious agents of Animals and plants
The innate immune response

Lecture 6.

Adaptive immune response
Applications of immune responses
Immunologic disorders
Examination 4.

Lecture 7.

Host-Microbe interactions
Epidemiology
Antimicrobial medications

Lecture 8.

Skin infections
Respiratory system infections
Alimentary system infections
Examination 5.

Lecture 9.

Genitourinary infections
Nervous system infections
Wound infections

Lecture 10.

Blood and lymphatic infections
HIV disease and complications of immunodeficiency
Microbial ecology

Lecture 11.

Environmental microbiology:
Treatment of water, Wastes, and polluted habitats
Food microbiology

Lecture 12. REVIEW SESSION
Examination 6.

FINAL EXAMINATION

GRADING SCALE:
Your final grade for this course will be based on the scheme below:

	Points
Six (6) examinations	600
Six (6) quizzes	60
Assignments/homework	330
Class Participation/Attendance	10

Total Assigned Points *1000*

FINAL GRADE:
A = 900 **B** = 800 **C** = 700 **D** = 600 **F** = < 400

Grading Scale, examination, laboratory and lecture schedules are subject to change at the discretion of the Instructor.

COURSE POLICIES:

1. ATTENDANCE: Attendance is mandatory for **ALL** students except during medical emergencies in which a student may not be able to attend class meetings. Under such circumstances, the student must present a medical excuse from a physician to the Instructor in order to make up missed examinations.

2. DISHONESTY: All forms of academic dishonesty including cheating and plagiarism during examinations, quizzes and assignments will result in disqualification of the student.

3. ELECTRONIC DEVICES: The use of electronic devices including radios, CD players and cell phones are prohibited during **ALL** lectures and testing periods. Cell phones **MUST** be turned **OFF** or put on **VIBRATOR MODE** during class sessions. Five (5) points will be deducted from a student's overall SCORE prior to computing the FINAL GRADE each time the student's cell phone rings during class session. There is NO exception to this rule. If a student MUST have electronic devices in **USER MODE** during class session due to **MEDICAL** emergencies, then prior arrangements MUST be made with the Instructor.

4. MAKE UP (TEST) POLICY

Missed examinations MUST be made up within 72 (three business days) hours of the missed exam, at which time the student may be allowed to take the original examination.
Beyond this point, however the instructor reserves the right to present the student a different examination. **The examination will always be an essay format**. The period to make up examination will **NOT** be extended beyond two (2) weeks of the missed examination. NO EXCEPTION TO THIS RULE. Failure to make up examination within the allowed time frame, will result in a "0" grade for the missed examination. All make up examination must be scheduled. If examinations or other assignments are missed due to Medical Emergency or Death in the family, it is the Student's responsibility to provide appropriate documentation to the Instructor. **NO MAKE-UP is available for missed QUIZZES or LAB assignments.**

5. STUDENT'S RESPONSIBILITY: IT IS THE STUDENT'S RESPONSIBILITY TO COMPLETE ALL ASSIGNED TASKS, TAKE SUPPLEMENTAL NOTES DURING CLASS SESSIONS AND TO CHECK BLACKBOARD REGULARLY FOR ANNOUNCEMENTS, POSTED EXAMINATIONS AND QUIZZES SCHEDULES AS APPLICABLE.

6. During testing, each student will take a different version of the examination in an effort to minimize scholarly misconduct. A student involved in scholarly misconduct during examinations, quizzes or laboratory assignments will be disqualified and further disciplinary actions may be taken.

7. Absolute silence is expected during lecture sessions and **NO FOOD** or **DRINKS** are allowed in the laboratory or classroom. Talking during class sessions will result in a deduction of five (5pts) points per incident from the student's overall score.

8. All examinations and quizzes schedules, laboratory and project due dates will be announced or posted at least seven (7) days in advance by the instructor.

9. **DISABILITY:** ALL students with disabilities must notify the Instructor for any needed assistance in compliance with the Americans Disability Act (ADA). In compliance with ADA policies, all qualified students enrolled in the course are entitled to "reasonable accommodations."

200 LABORATORY (OUTLINE): 1.0 credit hour (Separate Course)

Manual:

- Kleyn and Bicknell, 6e, 2009, McGraw Hill, ISBN 978-0-07-299549-7

THE FOLLOWING LABS WILL BE COMPLETED FROM THE LABORATORY MANUAL

1. The Scientific Method
2. Microscopy and Metric Measurements
3. Chemical Composition of Cells
4. Cell Structure and Function
5. The Use of Immersion Oil Lens and Determining the Motility
6. 6. Introduction to Staining of Microorganisms – Positive and Negative Stains
7. Differential Stains – Gram Stain
8. Chemically Defined, Complex, Selective, and Differential Media

Additional Laboratory Handouts

- Laboratory Safety Rules
- Lab Equipment
- The Microscope
- Classification Lab
- Scientific Method Lab
- Biological Terms
- Guidelines for Writing Lab Reports